

Access to the Federal High-Performance Computing-Centers and PRACE

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TOP500 international

Rank	System description	Total Cores	Rpeak in TFlop/s	Rmax in TFlop/s	Power in kW
1	Supercomputer Fugaku RIKEN Center for Computational Science, Japan	7630848	537212	442010	29899
2	Summit DOE/SC/Oak Ridge National Laboratory, United States	2414592	200795	148600	10096
3	Sierra DOE/NNSA/LLNL, United States	1572480	125712	94640	7438
4	Sunway TaihuLight National Supercomputing Center in Wuxi, China	10649600	125436	93015	15371
5	Selene NVIDIA Corporation, United States	555520	79215	63460	2646
6	Tianhe-2A National Super Computer Center in Guangzhou, China	4981760	100679	61444	18482
7	JUWELS Booster Module Forschungszentrum Juelich (FZJ), Germany	449280	70980	44120	1764
8	HPC5 Eni S.p.A., Italy	669760	51721	35450	2252
9	Frontera Texas Advanced Computing Center/Univ. of Texas, United States	448448	38746	23516	-
10	Dammam-7 Saudi Aramco, Saudi Arabia	672520	55424	22400	-

TOP500 German systems

Rank	System description	Total Cores	Rpeak in TFlop/s	Rmax in TFlop/s	Power in kW
7	JUWELS Booster Module Forschungszentrum Juelich (FZJ), Germany	449280	70980	44120	1764
15	SuperMUC-NG Leibniz Rechenzentrum, Germany	305856	26874	19477	-
16	Hawk HLRS - Höchstleistungsrechenzentrum Stuttgart, Germany	698880	25160	19334	3906
44	JUWELS Module 1 Forschungszentrum Juelich (FZJ), Germany	114480	9891	6178	1361
47	Emmy+ HLRN+ at GWDG/University of Göttingen, Germany	120296	8911	5949	-
51	COBRA Max-Planck-Gesellschaft MPI/IPP, Germany	127520	9794	5613	1635
55	Lise HLRN at ZIB/Konrad Zuse-Zentrum Berlin, Germany	103680	7631	5356	1258
76	JURECA Forschungszentrum Juelich (FZJ), Germany	155150	6564	3783	1345
100	Lichtenberg II (Phase 1) Technische Universitaet Darmstadt, Germany	59136	4352	3148	690
109	Mistral DKRZ - Deutsches Klimarechenzentrum, Germany	99072	3963	3011	1116

Application considerations

Targeted HPC-System Tier:

- tier-0: European Centres
- tier-1: National Centres
- tier-2: Regional/University Centres

My institution:

- German University or German Research lab
- European researcher
- Industry

My Project:

- Amount of core hours
- Scalability of application
- Access duration
- Call deadlines

High Performance Computing in Germany

- **Federal:**
 - ⇒ Gauss Centre for Supercomputing (GCS)
- **Regional:**
 - ⇒ Nationales Hochleistungsrechnen (NHR)
- **Thematic access:**
 - DKRZ (Earth system research)
 - www.dkrz.de
 - DMRZ (DWD, Weather)
 - https://www.dwd.de/DE/derdwd/it/it_node.html
 - MPCDF (Max-Planck Institutes)
 - www.mpcdf.mpg.de
- **European:**
 - ⇒ PRACE



Gauss Centre for Supercomputing (GCS)

- **GCS Members:**

- HLRS - High-Performance Computing Center Stuttgart
- www.hlrs.de
- JSC - Jülich Supercomputing Centre
- www.fz-juelich.de/jsc/
- LRZ – Leibniz Supercomputing Centre, Garching near Munich
- www.lrz.de



- **Application:**

- **GCS Large-Scale Projects:**
requests \geq 2% of the systems' annual production
Call twice a year (Deadlines usually at end of winter and end of summer)
- **GCS Regular Projects:**
Hawk and SuperMUC-NG applications at any time,
JUWELS twice a year (same time as GCS large-scale projects)

- <https://www.gauss-centre.eu>

HLRS - HAWK

Nodes	5,632
Processortype	AMD EPYC 7742
CPUs / Node	2
Cores / CPU	64
Memory / Node	256 GB
Total Cores	720,896
Total Memory	1.44 PB
Network	InfiniBand HDR (200 Gbit/s)
Network Topology	Enhanced 9D-Hypercube
Peak Performance	26 PetaFlop/s



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JSC - JUWELS

JUWELS Cluster

Nodes	2271 thin / 240 fat 56 (GPU)
Processortype	Intel Xeon Skylak
CPUs / Node	2 × 48 cores
Memory / Node	96 GB / 192 GB / 192 GB
Total Cores	122,768
Network	InfiniBand
Network Topology	Fat Tree
Peak Performance	10.6 (CPU) + 1.7 (GPU) PetaFlop/s



Copyright: Forschungszentrum Jülich

JUWELS Booster

Nodes	936 nodes
Processortype	AMD EPYC 7402
CPUs / Node	2 × 24 cores
GPUs	4 × NVIDIA A100
Total GPUs	3744
Network	InfiniBand
Network Topology	Dragon Fly+
Peak Performance	73 PetaFlop/s

LRZ - SuperMUC-NG

Nodes	6,336 Thin nodes 144 Fat nodes
Processortype	Intel Xeon Skylak
CPUs / Node	2
Cores / CPU	48
Memory / Node	96 GB / 144 GB
Total Cores	311,040
Total Memory	719 TB
Network	OmniPath (100 Gbit/s)
Network Topology	islands of fat trees
Peak Performance	26.9 PetaFlop/s



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Nationales Hochleistungsrechnen (NHR)

- Operation and Access to Tier-2 systems
- List of member Universities/Computecentres:
 - Technische Hochschule Aachen (IT Center)
 - Berlin University Alliance (Zuse-Institut Berlin)
 - Technische Universität Darmstadt (Hochschulrechenzentrum)
 - Technische Universität Dresden (Zentrum für Informationsdienste und Hochleistungsrechnen)
 - Universität Erlangen-Nürnberg (Regionales Rechenzentrum Erlangen)
 - Universität Göttingen (Gesellschaft für wissenschaftliche Datenverarbeitung mbH Göttingen)
 - Karlsruher Institut für Technologie (Steinbuch Centre for Computing)
 - Universität Paderborn (Paderborn Center for Parallel Computing)
- <https://www.nhr-gs.de/>

Partnership for Advanced Computing in Europe (PRACE)

Access types:

- Preparatory Access (rolling call):
Optimise, scale and test codes on PRACE Tier-0 systems
- Project Access (bilateral call):
“Tier-0 users with tested codes”
- DECI Access:
Tier-1 access to supercomputers in other European country
- SHAPE Access:
“SMEs with the potential of using HPC”



Further information:

- <https://prace-ri.eu/>
- “Guide For Applicants To Tier-0 Resources”
- Prace project partner (e.g. HLRS, boenisch@hlrs.de)